

CLAIMS

What is claimed is:

1. A method for automatic gain control for a wireless transmit and receive unit (WTRU) in a time-slotted communications system, the WTRU receiving a signal, the method comprising the steps of:

- (a) initializing an automatic gain control loop;
- (b) sampling the received signal with an analog-to-digital converter (ADC);
- (c) estimating the power of the received signal;
- (d) comparing the estimated power of the received signal with a reference power level;
- (e) generating an error signal based upon the difference between the estimated power and the reference power level;
- (f) accumulating the error signals generated by a plurality of received signals in an accumulator;
- (g) looking up the accumulator value in a table to locate a control word for an attenuator;
- (h) passing the control word to the attenuator to adjust the gain; and
- (i) repeating steps (c) through (h) for a predetermined number of iterations.

2. The method according to claim 1, wherein the initializing step includes the steps of:

- initializing the accumulator; and
- setting the gain of the attenuator.

3. The method according to claim 2, wherein the initializing step further includes the step of determining whether the current slot has previously been active prior to initializing the accumulator, if the current slot has previously been active then the accumulator is initialized to a first value, and if the current slot has not previously been active then the accumulator is initialized to a second value.

4. The method according to claim 3, wherein the first value equals the value of the accumulator at the end of the same slot from a previous frame.

5. The method according to claim 3, wherein the first value is set to a small initial value.

6. The method according to claim 5, wherein the small initial value is in the range of 12-24 dB above the minimum gain setting of the attenuator.

7. The method according to claim 3, wherein the second value equals the last value of the gain setting determined by a cell search automatic gain control.

8. The method according to claim 2, wherein the setting step includes searching a second lookup table with the value of the accumulator to find a second control word for the attenuator.

9. The method according to claim 1, wherein the estimating step includes skipping the first few samples immediately following the gain adjustment.

10. The method according to claim 1, wherein the estimating step includes using a third lookup table to correct the estimate if the ADC is clipping.

11. The method according to claim 1, wherein the comparing step includes using a log comparator.

12. The method according to claim 1, further comprising the steps of:

- (j) storing the accumulator value for the current slot in a memory; and
- (k) applying the previously set gain for the remainder of the slot.

13. A receiver having an automatic gain control, said receiver for use in a time-slotted communications system, comprising:

- initializing means for initializing an automatic gain control loop;
- sampling means for sampling a received signal;
- estimating means for estimating the power of the received signal;
- comparison means for comparing the estimated power of the received signal with a reference power level;
- generating means for generating an error signal based upon the difference between the estimated power and the reference power level;
- accumulating means for accumulating the error signals generated by a plurality of received signals, said accumulating means storing an accumulated value; and
- lookup means for looking up the accumulated value in a table to locate a control word for an attenuator, said control word used to adjust the gain of said attenuator.

14. A receiver according to claim 13, wherein said initializing means includes second initializing means for initializing said accumulating means with an initial value; and

setting means for setting the gain of said attenuator.

15. A receiver according to claim 14, wherein said setting means includes second lookup means for looking up the initial value in a second table to locate a second control word for said attenuator, said second control word used to adjust the gain of said attenuator.

16. A receiver according to claim 13, wherein

said sampling means includes an analog-to-digital converter (ADC); and

said estimating means includes third lookup means for looking up a correction factor if said ADC is clipping.

17. A receiver according to claim 13, wherein said comparison means includes a log comparator.

18. A receiver according to claim 13, wherein said accumulating means includes an accumulator.

19. A receiver according to claim 13, further comprising storing means for storing the accumulated value.

20. A receiver according to claim 19, wherein said storing means includes a memory.

21. A receiver for use in a time-slotted communications system, comprising:
an automatic gain control loop;
an initializer for initializing said automatic gain control loop;
a sampler for sampling a received signal;
an estimator for estimating the power of the received signal;
a comparator for comparing the estimated power of the received signal with a reference power level;

a generator for generating an error signal based upon the difference between the estimated power and the reference power level;

an accumulator for accumulating the error signals generated by a plurality of received signals, said accumulator storing an accumulated value;

an attenuator; and

a lookup device for looking up the accumulated value in a table to locate a control word for said attenuator, said control word used to adjust the gain of said attenuator.

22. A receiver according to claim 21, wherein said initializer includes a second initializer for initializing said accumulator with an initial value; and a setting device for setting the gain of said attenuator.

23. A receiver according to claim 22, wherein said setting device includes a second lookup device for looking up the initial value in a second table to locate a second control word for said attenuator, said second control word used to adjust the gain of said attenuator.

24. A receiver according to claim 21, wherein said sampler includes an analog-to-digital converter (ADC); and said estimator includes a third lookup device for looking up a correction factor if said ADC is clipping.

25. A receiver according to claim 21, wherein said comparator is a log comparator.

26. A receiver according to claim 21, further comprising a memory for storing the accumulated value.